Phono® Solar
SHARE THE SUN, POWER THE FUTURE!

Phono Solar Technology Co., Ltd.

Add: No. 1 Xinghuo Rd., Nanjing Hi-tech Zone, Nanjing, China
Tel: +86 25 5863 8000 Fax: +86 25 5863 8009
E-mail: support@phonosolar.com Website: www.phonosolar.com

PHONO SOLAR TECHNOLOGY CO., LTD.

Photovoltaic Module Installation Manual (IEC)

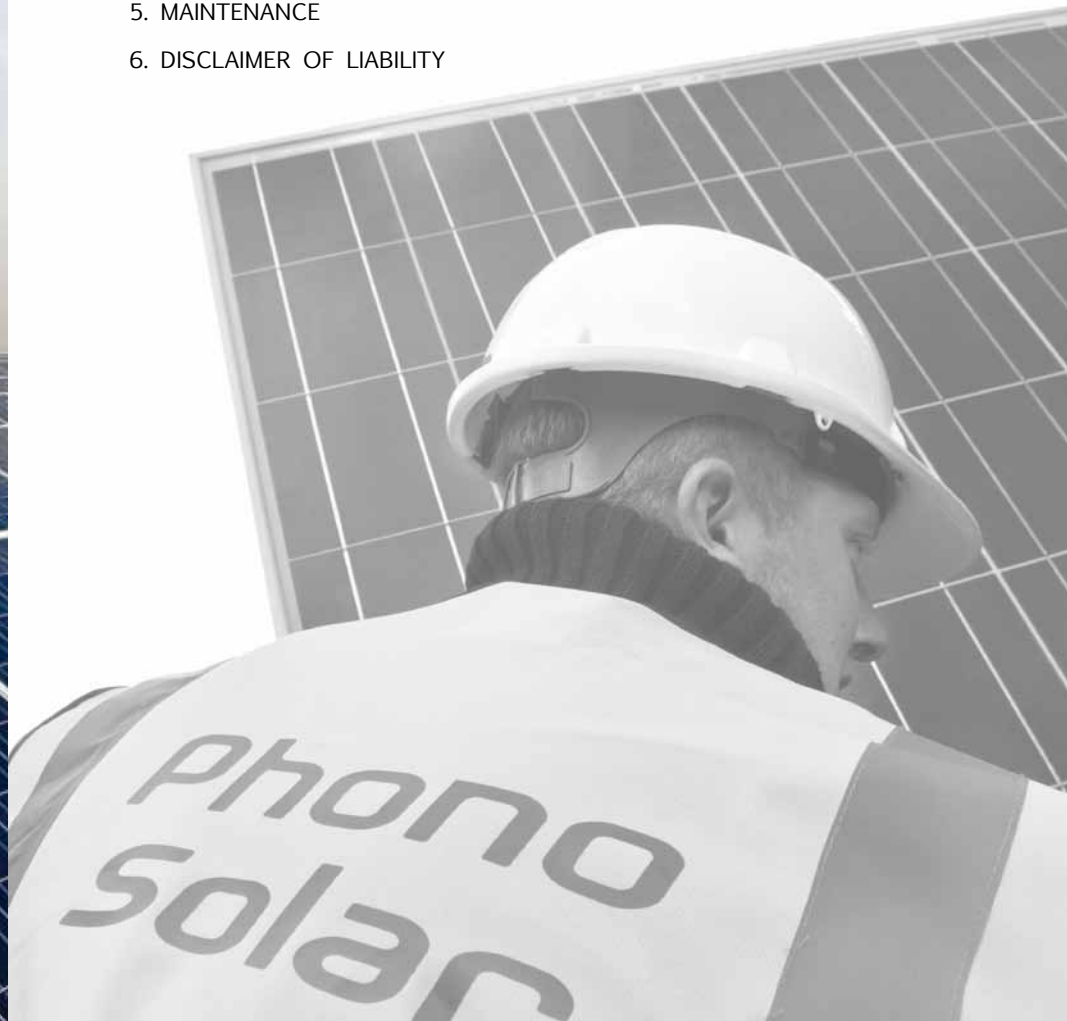
Version: IEC 2012-01

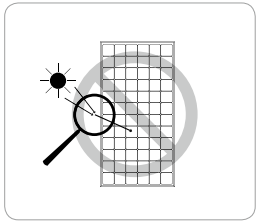
Copyright © PHONO SOLAR, 2012

Phono® Solar
SHARE THE SUN, POWER THE FUTURE!

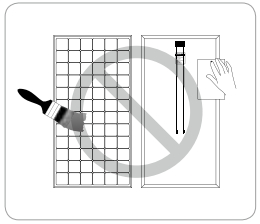
CONTENTS

1. IMPORTANT SAFETY GUIDE
2. PRODUCT IDENTIFICATION
3. MECHANICAL INSTALLATION
4. ELECTRICAL INSTALLATION
5. MAINTENANCE
6. DISCLAIMER OF LIABILITY

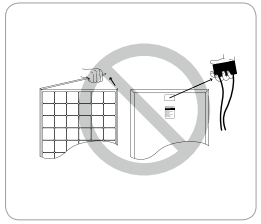




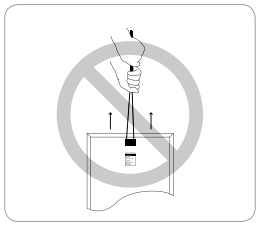
DO NOT use mirrors or magnifiers to concentrate sunlight onto the module.



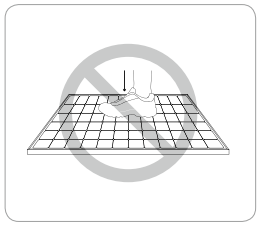
DO NOT paint the module or attach anything on to the back of the module.



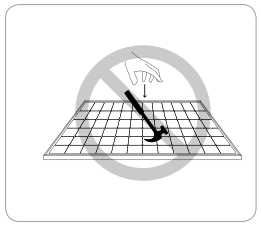
DO NOT attempt to disassemble the modules, and do not remove any attached nameplates or components from the module.



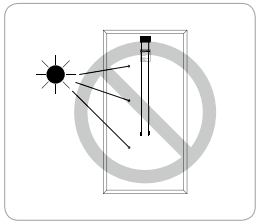
DO NOT lift or move the module by holding the junction box or cable.



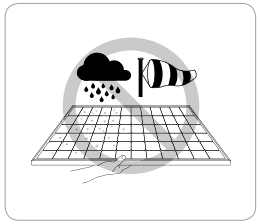
DO NOT place anything on the module or press on the module surface.



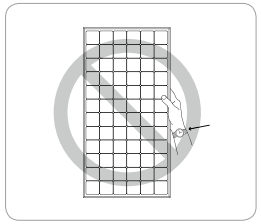
DO NOT drop the module or allow objects to fall on the module.



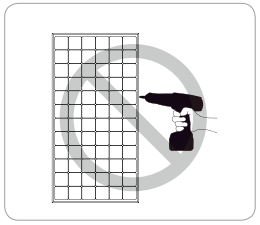
DO NOT expose the back of the module to direct sunlight.



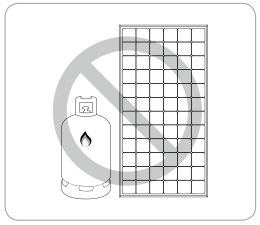
Do NOT install or handle module in wet or strong windy conditions.



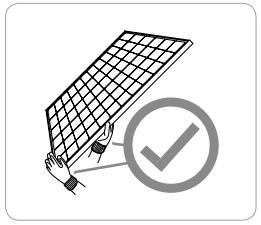
Do NOT wear metal ornaments while handling the module or during the installation.



DO NOT drill holes in the frame.



DO NOT use module near equipment or in places where flammable gases may be generated or collected.



Insulated gloves must be worn while handling the module and during the installation.

❶ IMPORTANT SAFETY GUIDE

This manual contains information regarding product identification and the safe installation and maintenance of photovoltaic modules (hereafter referred to as “module”) supplied by PHONO SOLAR TECHNOLOGY CO., LTD. (hereafter referred to as “PHONO SOLAR”). The term “module” can be interpreted as a single module or multiple modules depending on the context.

Installers must already be familiar with the mechanical and electrical requirements for a photovoltaic system. Installers must also read this manual carefully prior to installation. We recommend that you keep this manual in a safe place for future reference and in case of future sale or disposal of the module.

1.1 General Safety

- The installation of a photovoltaic system requires specialized skills and knowledge and must only be carried out by licensed/qualified persons.
- Installers should assume all risks of injury and do everything to avoid potential damages and risks that might occur during installation, including but not limited to, the risks of electric shock.
- PHONO SOLAR modules do not need special cables for connection. All of the modules have permanent junction boxes, cables and connectors.
- Do not use mirrors or magnifiers to concentrate sunlight onto the modules.
- The modules generate DC electrical energy from sunlight. They are designed for outdoor use and can be mounted onto frames on rooftops or in the ground etc.
- Do not paint the module or attach anything on to the back of the module.
- Do not attempt to disassemble the modules, and do not remove any attached nameplates or components from the modules.

1.2 Handling safety

- When handling the module insulated gloves must be worn.
- Inappropriate transportation and installation may break the module.
- Do not lift or move the module by holding the junction box or cable.
- Do not place anything on the module or press on the module surface.
- Do not drop the module or allow objects to fall on the module.
- Do not expose the back of the module to direct sunlight.
- Do not wear metal ornaments while handling the module.
- Do not install or handle modules in wet or strong windy conditions.

1.3 Installation safety

- Local, regional and state laws and regulations must be adhered to while installing a photovoltaic system. For example, any necessary licenses must be obtained prior to the installation commencing. Regulations around vehicles and ships must also be observed during the installation.
- Observe all safety rules for the other system components, including the cables, connectors, charging controllers, inverter and storage battery etc.
- Do not place the modules near a location where flammable gases are either generated or collected.
- Insulated gloves must be worn during the installation.
- Do not wear metal ornaments during the installation.
- Do not drill holes in the frame.
- Under normal conditions, a module is likely to produce more current and/or voltage than reported under Standard Test Conditions (STC). Accordingly, the values of Isc and Voc marked on the module nameplate should be multiplied by a factor when determining the component voltage ratings, conductor current ratings, fuse sizes, and the size of controllers connected to the photovoltaic system. The exact factor value should be suggested by a licensed/qualified person.
- The connecting ends with electricity may cause fire, spark or lethal shocks even when the modules are not connected.
- Electricity can be generated when the modules are exposed to sunlight, even if they are not connected. It is dangerous to touch 30V DC or higher, so never open the electrical connectors or unplug the electrical connectors while the circuit is under load, and do not touch the end with electricity during installations, when the modules are exposed to sunlight.
- Children should be kept away from the photovoltaic system.
- In order to prevent current and voltage generation during installation an opaque board can be used to cover the modules.
- Only use licensed/qualified insulated tools.
- The frame of the modules must be grounded according to local, regional and state safety and electrical standards. A recommended connector or equivalent must be used for the grounding cable. The grounding cable must be appropriately fastened to the module frame.
- Only Balance of System (BOS) in conformity to local, regional, state safety electricity standards and photovoltaic system such as connectors, cables and frames can be used, avoiding affect on the module performance and/or damage it.

1.4 Fire Safety

- Consult your local authority for guidelines and requirements for building or structural fire safety.
- Roof constructions and installations may affect the fire safety of a building; an improper installation may create a hazard in the event of a fire.
- Use components such as ground fault circuit breakers and fuses as required by the local authorities.
- Do not use the modules near a location where flammable gases are either generated or collected.
- The modules have been rated Fire Class C, and are suitable for mounting onto a Class A roof.

❷ PRODUCT IDENTIFICATION

On the back of each module there are 2 labels that provide the following information:

Nameplate: Describes the product type, rated power, rated current, rated voltage, open circuit voltage, short circuit current, all as measured under STC; weight, dimensions etc.; the maximum system voltage of 1000V DC.

Warning: The value of Voc times the number of modules in series should not be bigger than the maximum system voltage marked in the nameplate.

Barcode: This is used to identify each module. Each module has a unique and traceable serial number in the form of barcode. The barcode of each PHONO SOLAR module has 15 letter/digits.

Warning: Do not remove the nameplate or barcode. The PHONO SOLAR product warranty will be void if either the module nameplate or barcode is removed.

❸ MECHANICAL INSTALLATION

(Note: All instructions hereafter are for reference only. A licensed/qualified person or installer must be responsible for the design, installation, mechanical load calculation and security of the photovoltaic system.)

3.1 Select suitable locations for installation

- Select a suitable location for installing the modules.
- PHONO SOLAR recommends that to achieve the best performance the modules should face south in northern latitudes and north in southern latitudes. The exact tilt angle and orientation of mounted modules should be recommended by a licensed/qualified installer.

- The modules should be completely free of shade at all times.
- Do not place the modules near a location where flammable gases are either generated or collected.

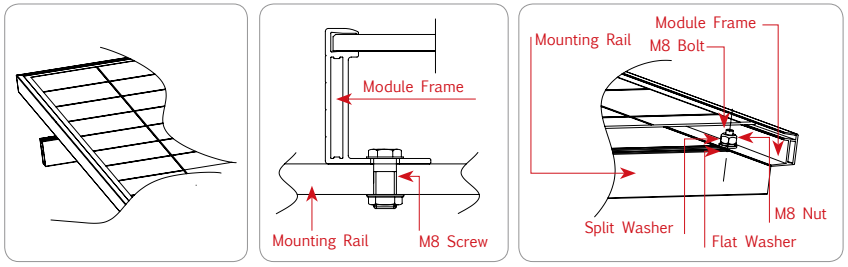
3.2 Select suitable mounting rails

- Please observe the safety regulations and installation instructions included with the mounting rail. If necessary please contact the supplier directly for further information.
- The modules must be safely set onto the mounting rail. The whole rail supporting the photovoltaic system must be strong enough to resist potential mechanical pressures caused either by wind or snow, in accordance with local, regional and state safety (and other associated) standards.
- Make sure that the mounting rail will not deform or affect the modules when it expands as a result of thermal expansion.
- The mounting rail must be made of durable, anti-corrosive and UV-resistant materials.

3.3 Select suitable mounting methods

PHONO SOLAR modules can be mounted using two methods:

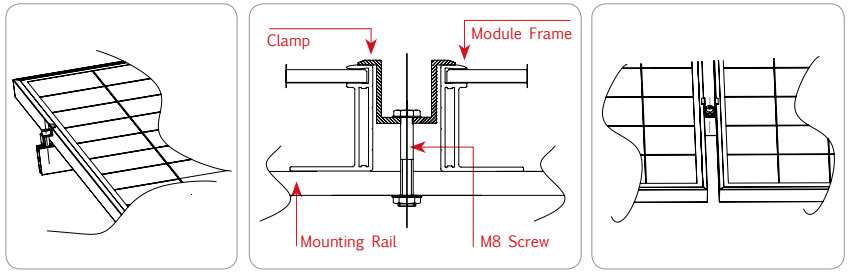
Screw Fitting: Use corrosion-proof screws in the existing installing holes in the module frame. Each module has 8 mounting holes for securing the module on the mounting rail. The module frame must be attached to a mounting rail using M8 corrosion-proof screws together with spring washers and flat washers in symmetrical locations on the module. The applied torque should be approximately 8Nm. Please find detailed mounting information in the below illustration:



Module installed using Screw Fitting method

Clamp fitting: Using suitable module clamps on the LONG side of the module frame to mount the modules is “portrait orientation” mode, while on the SHORT side of the module frame is “landscape orientation” mode.

The module clamps should not come into contact with the front glass and must not deform the module frame. Avoid any shadowing effects from the module clamps. The module frame can not be modified under any circumstances. Regardless of the orientation chosen, at least 4 clamps must be used on each module. For portrait orientation, 2 clamps should be attached to the long sides of the module and for landscape orientation 2 clamps should be attached to the short sides of the module. Depending on the local wind and snow loads, additional clamps may be required. The applied torque should be about 8Nm. Please find detailed mounting information in the below illustration:

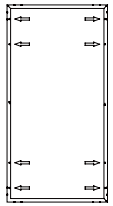
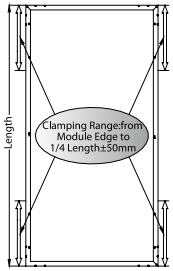
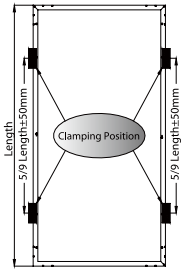
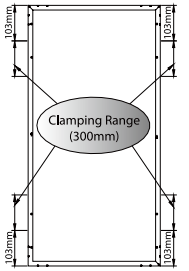
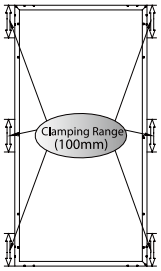
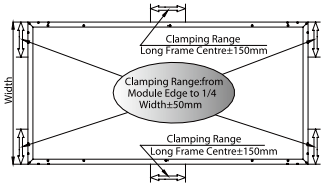
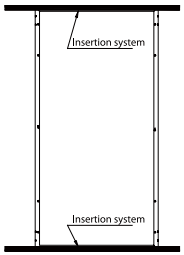
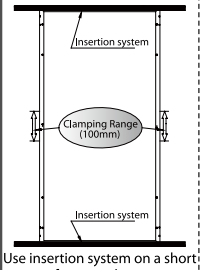
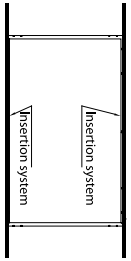


Module installed using Clamp Fitting method

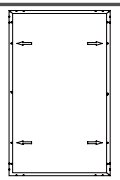
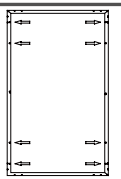
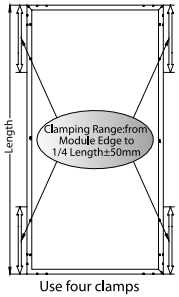
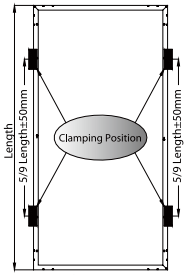
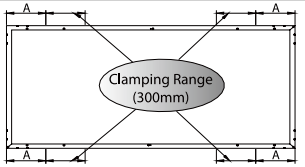
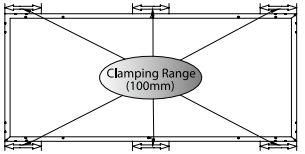
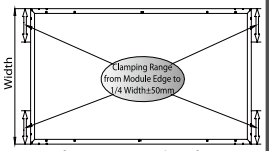
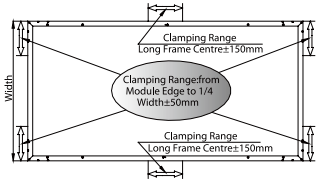
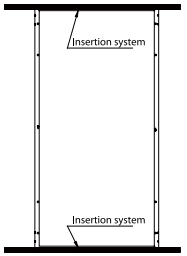
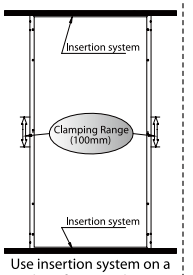
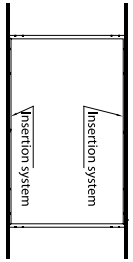
Select the appropriate installation method depending on the load (see below for more detailed information).

F Type	1580mm x 808mm x 35/45mm	DIAMOND Series
		ONYX Series
U Type	1640mm x 992mm x 45mm	DIAMOND Series
		ONYX Series
		INTELLIGENT Series

Phono Solar F Type module

	2400 Pa Load	3800 Pa Load	5400 Pa Load
Mounting system		Use four mounting holes	 Use eight mounting holes
Clamping system Attachment to the long frame	 Use four clamps	 Use four clamps	 Use four clamps  Use six clamps
Clamping system Attachment to the short frame			 Clamping Range Long Frame Centre±150mm Width Clamping Range:from Module Edge to 1/4 Width±50mm Clamping Range Long Frame Centre±150mm Use four clamps on the short frame and two clamps at the center of each long frame
Insertion system	 Use insertion system on short frame		 Use insertion system on a short frame and two clamps at the center of each long frame  Use an insertion system on a long frame

Phono Solar U Type module

	2400 Pa Load	3800 Pa Load	5400 Pa Load
Mounting system		 Use four mounting holes	 Use eight mounting holes
Clamping system Attachment to the long frame	 Use four clamps	 Use four clamps	 A(distance from module edge to clamping range) U series: 108mm 
Clamping system Attachment to the short frame	 Use four clamps on short frame		 Clamping Range Long Frame Centre±150mm Width Clamping Range:from Module Edge to 1/4 Width±50mm Clamping Range Long Frame Centre±150mm Use four clamps on the short frame and two clamps at the center of each long frame
Insertion System	 Use insertion system on short frame		 Use insertion system on a short frame and two clamps at the center of each long frame  Use an insertion system on a long frame

⚠ ***Warning: Do not attempt to drill holes in the module frame or in the glass surface of the module. Any such modifications will void the PHONO SOLAR product warranty.***

3.4 When installing a module on a pole ensure that the pole and mounting rail can withstand anticipated local winds. The pole must be installed on a hard base.

3.5 Ensure that the installation height is such that the lowest modules will not be covered by accumulated snow or shaded by the surroundings.

3.6 Ensure that there is adequate ventilation under the modules, conforming to local, regional and state standards and regulations.

3.7 A minimum distance of 10cm, between the roof plane and the frame of the module is generally recommended.

3.8 Observe the linear thermal expansion of the module frames. A minimum distance of 1cm between two modules is generally recommended.

❹ ELECTRICAL INSTALLATION

(Note: All instructions hereafter are for reference only. A licensed/qualified person or installer must be responsible for the design, installation, mechanical load calculation and security of the photovoltaic system.)

4.1 Any hardware used must be compatible with the mounting material to avoid galvanic corrosion.

4.2 Only use connectors that are designed for photovoltaic systems and that match PHONO SOLAR modules.

4.3 When working with the connectors only use tools as recommended by the connector manufacturer.

4.4 PHONO SOLAR recommends that the same type of modules are connected together in order to avoid any system power loss.

4.5 The maximum number of series connected modules depends on system design, the type of inverter used and environmental conditions.

4.6 Select insulated cables that are able to resist to ultraviolet radiation and extreme weather conditions.

4.7 The rated voltage of the cable chosen must be appropriate to the overall maximum voltage of the system.

4.8 The module frame must be grounded according to local, regional and state safety and electrical standards. Ensure that a recommended connector or equivalent is used for the grounding cable. The grounding cable must be properly fastened to the module frame.

❺ MAINTENANCE

In order to ensure optimum module performance, PHONO SOLAR recommends the following:

5.1 If necessary, the glass front of the module can be cleaned with water and a soft sponge or cloth. A mild, non-abrasive detergent can be used to remove more stubborn stains.

5.2 Check the electrical and mechanical connections periodically and make sure they are clean, safe, complete and secure.

5.3 In the event of a problem, consult with a licensed/qualified person.

❻ DISCLAIMER OF LIABILITY

Since it is impossible for PHONO SOLAR to control installation, operation, application and maintenance of the photovoltaic system according to this instruction, PHONO SOLAR does not accept responsibility and expressly disclaims liability for any loss, damage, or expense arising out of or in any way connected with such installation, operation, use or maintenance.

PHONO SOLAR will not take any responsibilities for any possible violation of patent rights and third party rights that are related to application of the solar energy system. No permission of patents is given through implication.

The information of this instruction is from knowledge and experiences of PHONO

SOLAR, and so it is reliable. However, the instructions and suggestions of this instruction do not make an external or internal of guarantee. PHONO SOLAR reserves the right to revise this instruction, products and all the information about products without prior notification to customers.